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System Consisting of a Small Electrical Device and an Auxiliary Electrical Device
Assigned Thereto

This invention relates to a system comprising a small electrical device and an auxiliary electrical device assigned thereto with a receiving arrangement for the small electrical device, each of said two devices being provided with corresponding first electrical and/or electromagnetic coupling elements for transmitting energy and/or information.

Systems of this type can be constructed for diverse possible uses; for example, electrical hair clippers, electrical toothbrushes or electrical household appliances as small electrical devices can cooperate with an auxiliary device for charging, cleaning and/or diagnosis purposes.

From DE 44 02 237 C1 there is known a cleaning and charging device for a dry shaving apparatus. This device is used to clean the shaving head and to charge the electrical storage cells which are arranged in the dry shaving apparatus. For this purpose the dry shaving apparatus is inserted with its shaving head in a receiving part, which is then filled with a cleaning fluid. The cleaning fluid dislodges hair residues and deposits adhering to the shaving head, which are then conveyed together with the cleaning fluid back to a fluid container. During the cleaning operation the dry shaving apparatus is also put into operation temporarily in order to enhance the cleaning effect. For this purpose the dry shaving apparatus is electrically connected to the cleaning device. This connection is used not only to transmit electrical energy for operating the dry shaving apparatus and, where applicable, for charging the electrical storage cells, it can also be used to exchange information and control signals between the two devices.

Contact between the dry shaver and the cleaning device is established on the known system by way of the appliance socket on the dry shaver, which is connected to the electrical terminals in the cleaning device. The appliance socket is arranged on the end of the housing of the dry shaving apparatus remote from the shaving head; it also serves to connect a power cable. The electrical terminals of the cleaning device are arranged in the upper end of a contact dome where they can be moved by means of a pushbutton in the direction of the appliance socket on the

dry shaving apparatus. With this contact arrangement the electrical terminals are held in this position by detent hooks; the dry shaving apparatus is then electrically connected to the cleaning device and mechanically locked. In this arrangement it is a disadvantage that the construction of the cleaning device and contact dome is very complex and expensive to manufacture and assemble. Furthermore, positional deviations or manufacturing tolerances can result in plugging or jamming problems when establishing the contact. An exact, smooth and hence convenient docking of the dry shaving apparatus onto the cleaning device with a reliable electrical contact then becomes difficult.

In addition, auxiliary devices constructed as charging stations for battery-driven small devices which make contact with the small electrical device either directly in electrically conducting manner or alternatively, by induction are also known.

One disadvantage of small electrical devices with a separate charging station is, however, that they do not allow mains operation, with the result that when the storage cell is depleted, no operation is possible until the charging cycle is completed. Another disadvantage is that the usually bulky and also heavy charging device has to be taken along as well on lengthy journeys in order to ensure operation of the small device and its supply of electrical energy.

It is therefore an object of the present invention to improve a system of the type initially described such that, on the one hand, it can be manufactured at significantly reduced expense and, on the other hand, it permits an extremely easy and at the same time convenient use. Furthermore, it should also be possible to use the small electrical device independently of the auxiliary device.

This object is accomplished according to the invention in that at least the small electrical device has at least one additional coupling element of this type.

The additional electrical coupling element is advantageously arranged at a location separate from the first coupling element so that one of the two coupling elements can be optimally positioned for docking onto the auxiliary device and the other coupling element for the best possible use of the small electrical device in the mains operating mode.

A particularly convenient, reliable and user-friendly way of docking can be realized when an automatic electrical or electromagnetic contact is established while positioning the small electrical device in the receiving arrangement of the auxiliary device.

A simple and highly efficient possibility of establishing contact both for battery-driven as well as mains-powered devices is afforded when the additional coupling element is an electrical plug-type connection, in particular an appliance socket.

The first electrical coupling elements can be constructed as electrical contact elements, which means that the constructional expense is very small. To realize a convenient and also reliable contact arrangement it is an advantage for the electrical contact elements of at least one of the two devices to be resiliently constructed.

Alternatively, the first coupling elements can also be constructed as inductive energy and/or signal transmitting elements.

A preferred field of application of the invention is a version of the small electrical device as a dry shaver with a shaving head and of the auxiliary device as a cleaning and/or charging station for cleaning the shaving head and/or charging the storage cell of the dry shaver.

In this arrangement it is a particular advantage when a dry shaver, which is used in such a system, is constructed such that its first coupling element is arranged in close proximity to or directly in the area of the shaving head and the additional coupling element on the end of the housing of the dry shaver remote from the shaving head.

Other objects, features, advantages and application possibilities of the present invention will become apparent from the subsequent description of embodiments. It will be understood that any single feature or any combination of single features described or represented by illustration form the subject-matter of the present invention irrespective of their summary in the claims or their back-references.

The single Figure shows a schematic and greatly simplified representation of a dry shaving apparatus in a related cleaning and charging device.

The drawing shows a dry shaving apparatus 1 with a shaving head 2, which is inserted head first – in other words with its shaving head down – in the receiving arrangement 3 of the cleaning and charging device 4. Inside the receiving arrangement the shaving head 2 can be cleaned in known manner by means of a cleaning fluid. For this purpose the cleaning and charging device 4 includes a fluid container and suitable devices for conveying the fluid. For the sake of clarity of illustration, these devices and the related drives and their electrical supply are not shown in the drawing. Similarly, a possible device for drying the shaving head is not shown in the drawing.

The cleaning and charging device 4 is also used to charge the electrical storage cells of the dry shaving apparatus 1 if it is a battery-driven device. Another function of the cleaning and charging device 4 includes parking the dry shaving apparatus 1; in other words it also serves as a device holder adapted to be mounted optionally on a wall.

The receiving arrangement 3 is constructed in the shape of a trough, with the rear wall 5 being constructed to be somewhat higher than the front wall 6. The rear wall 5 also acts as support for the dry shaving apparatus 1 shown in the side view. The cleaning and charging device 4 has an electrical connection 7 which is constructed as an appliance socket from which it can be supplied with electricity from the mains. The electrical contact between the dry shaving apparatus 1 and the cleaning and charging device 4 is established via two contact buttons 8 which are arranged in the rear wall 5 of the cleaning and charging device 4, and two corresponding contact elements 9 which are integrated in one of the broad sides, i.e., the front or rear side, of the dry shaving apparatus 1. Both the contact buttons 8 and the contact elements 9 are of a spherical configuration. This facilitates the insertion of the dry shaving apparatus 1 in the cleaning and charging device 4, thus preventing the risk of catching. The contact buttons 8 are elastically biased and hence resiliently supported in the wall by means of a compression spring 10 acting in the direction of the dry shaving apparatus 1. Each contact button 8 has a circumferential collar 11 holding it securely captured. If no dry shaving apparatus is inserted in

the receiving arrangement 3, this collar 11 rests against the wall 5 due to loading by the compression spring 10. When the dry shaving apparatus 1 is inserted, the pressure exerted by the contact element 9 urges the associated contact button 8 a little into the wall 5, proper electrical contact being always assured by the elastic bias.

On the one hand this electrical contact is used to transmit control signals and information between the dry shaving apparatus and the cleaning and charging device, enabling, for example, information about the device type, the degree of soiling and the frequency and duration of use to be transmitted as well as signals for controlling the cleaning process. In addition, the electrical contact is also used for transmitting energy for charging electrical storage cells that are integrated in the dry shaving apparatus 1, inasmuch as it is designed for battery operation.

As the result of the open, trough-shaped configuration of the receiving arrangement 3 and the absence of all obstructions such as a contact arm it is very easy and convenient to insert the dry shaving apparatus 1 in the cleaning and charging device 4. The cleaning and charging device can also be constructed in very compact form as the result. The electrical contact is established automatically after parking the dry shaving apparatus 1 in the receiving arrangement 3 and leaning it against the rear wall 5.

To be able also to operate the dry shaving apparatus 1 (for example when it is a pure mains device) or charge it independently of the cleaning and charging device 3, the dry shaving apparatus is equipped on its end 12 remote from the shaving head 2 with an appliance socket 13 through which it can be electrically contacted using a power cable. This appliance socket 13 corresponds preferably to the electrical connection 7 of the cleaning and charging device 4 so that one and the same power cable can be used both for operating the cleaning and charging device 4 and for operating the dry shaving apparatus 1 itself.

It will be understood, of course, that instead of the electrically conducting contact elements 9 and the contact buttons 8 it is also possible to provide for an electrical coupling between the dry shaving apparatus 1 and the cleaning and charging device 4 by means of inductive elements in accordance with an embodi-

ment not shown in the drawing, in which case provision is made in both the dry shaving apparatus 1 and the cleaning and charging device 4 for coil arrangements known in the art.